

apparatus and a signal receiving circuit that reduce, with a simple structure, mutual interference generated when a plurality of tuners operate at a time.

Still another object of the present invention is to provide a signal receiving apparatus and a signal receiving circuit capable of reducing the performance

5 degradation due to unnecessary radiation and realizing a reduction in product costs, in the receiver having a plurality of built-in tuners.

According to one aspect of the present invention proposed for accomplishing the above objects, there is provided a signal receiving apparatus including a plurality of signal receiving means having: an input means for inputting a broadcast wave in  
10 which a video signal and/or an audio signal are modulated in a predetermined format; a mount layer on which a circuit for selecting, from the broadcast wave, a video signal and/or an audio signal included in a predetermined frequency band and demodulating the selected signals is mounted; and a plurality of ground layers which are arranged on the opposite surface of a circuit mounting surface of the mount layer on which the  
15 circuit is mounted, with a predetermined distance from the mount layer. The mount layer and the ground layers are stacked at predetermined intervals. The signal receiving means are arranged such that the lowermost ground layer of one signal receiving means and the circuit mounting surface of another signal receiving means face each other. The signal receiving apparatus further includes: a decode means for  
20 decoding the video signal and/or audio signal that have been selected and demodulated; and an output means for outputting the demodulated video signal and/or

audio signal to an external device.

In the signal receiving apparatus according to the present invention, disadvantages due to mutual interference caused by high frequency broadcast waves running between the signal receiving means can be reduced.

5 In particular, it is preferable that a dielectric layer be provided between the mount layer and the uppermost ground layer, and between the respective ground layers. A plurality of signal receiving means may be provided for a broadcast wave. Alternatively, a plurality of signal receiving means may correspond to broadcast waves.

10 According to another aspect of the present invention, there is provided a signal receiving circuit comprising: an input means for inputting a broadcast wave in which a video signal and/or an audio signal are modulated in a predetermined format; a mount layer on which a circuit for selecting, from the broadcast wave, a video signal and/or an audio signal included in a predetermined frequency band and demodulating the  
15 selected signals is mounted; and a plurality of ground layers which are arranged on the opposite surface of a circuit mounting surface of the mount layer, with a predetermined distance from the mount layer. The mount layer and the ground layers are stacked at predetermined intervals. In the signal receiving circuit according to the present invention, disadvantages due to mutual interference caused by  
20 high frequency broadcast waves when the signal receiving means adjacently arranged.

In particular, it is preferable that a dielectric layer be provided between the

mount layer and the uppermost ground layer, and between the respective ground layers.

A receiver according to the present invention includes at least first and second tuners. Each of the first and second tuners has a double-sided printed board and  
5 predetermined components. The double-sided printed board has one surface serving as components mounting surface and other surface the whole area of which serves as a ground surface. The mounting surface of the double-sided printed board of the first tuner and the mounting surface of the double-sided printed board of the second tuner are configured to be in plane-symmetry. The double-sided printed boards of the first  
10 and second tuners are arranged in the apparatus such that the ground surfaces of the respective double-sided printed boards face each other.

The double-sided printed boards of the first and second tuners are shielded from each other by respective ground surfaces thereof, thereby suppressing unnecessary radiation.

15 The above and other objects, advantages and features of the present invention will be more apparent from the following description taken in conjunction with the accompanying drawings.

#### Brief Description of the Drawings

20 FIG. 1 is a view for explaining an arrangement of the conventional tuner circuit board in a set-top box;

CLAIMS

REPLACED BY  
ART 34 AMDT

1. A signal receiving apparatus comprising  
a plurality of signal receiving means including:

5 input means for inputting a broadcast wave in which a video signal and/or an  
audio signal are modulated in a predetermined format;

a mount layer on which a circuit for selecting, from the broadcast wave, a video  
signal and/or an audio signal included in a predetermined frequency band and  
demodulating the selected signals is mounted; and

10 a plurality of ground layers which are arranged on the opposite surface of a  
circuit mounting surface of the mount layer on which the circuit is mounted, with a  
predetermined distance from the mount layer, the mount layer and the ground layers  
being stacked at predetermined intervals, wherein

the signal receiving means are arranged such that the lowermost ground layer  
15 of one signal receiving means and the circuit mounting surface of another signal  
receiving means face each other, and

the signal receiving apparatus further comprising:

decode means for decoding the video signal and/or audio signal that have been  
selected and demodulated, and

20 output means for outputting the demodulated video signal and/or audio signal  
to an external device.

REPLACED BY  
ART 34 AMDT

2. The signal receiving apparatus according to claim 1, comprising dielectric layers between the mount layer and the uppermost ground layer, and between the respective ground layers.

3. The signal receiving apparatus according to claim 1, wherein the plurality of  
5 signal receiving means are provided for a broadcast wave.

4. The signal receiving apparatus according to claim 1, wherein the plurality of signal receiving means correspond to broadcast waves.

5. The signal receiving apparatus according to claim 1, comprising recording means for storing the video signal and/or audio signal.

10 6. The signal receiving apparatus according to claim 1, comprising two ground layers.

7. A signal receiving circuit comprising:

input means for inputting a broadcast wave in which a video signal and/or an audio signal are modulated in a predetermined format;

15 a mount layer on which a circuit for selecting, from the broadcast wave, a video signal and/or an audio signal included in a predetermined frequency band and demodulating the selected signals is mounted; and

a plurality of ground layers which are arranged on the opposite surface of a circuit mounting surface of the mount layer, with a predetermined distance from the  
20 mount layer, wherein

the mount layer and the ground layers are stacked at predetermined intervals.

REPLACED BY  
ART 34 AMDT

8. The signal receiving circuit according to claim 7, comprising dielectric layers between the mount layer and the uppermost ground layer, and between the respective ground layers.

9. The signal receiving circuit according to claim 7, comprising two ground layers.

5 10. A receiver comprising; at least first and second tuners, wherein each of the first and second tuners has a double-sided printed board and predetermined components, the double-sided printed board having one surface serving as components mounting surface and other surface the whole area of which serves as a ground surface,

10 the mounting side surface of the double-sided printed board of the first tuner and the mounting side surface of the double-sided printed board of the second tuner are configured to be in plane-symmetry, and

the double-sided printed boards of the first and second tuners are arranged in the apparatus such that the ground surfaces of the respective double-sided printed  
15 boards face each other.

11. The receiver according to claim 10, wherein the each of the double-sided printed boards of the first and second tuners includes an antenna input connector, and the double-sided printed board of the first and second tuners are arranged such that the antenna input connectors project through a rear-end panel of the receiver.

20 12. The receiver according to claim 11, wherein the first and second tuners are configured to receive digital satellite broadcasts.

**REPLACED BY  
ART 34 AMDT**

13. The receiver according to claim 11, comprising a device that stores and reproduces programs of the digital satellite broadcasts.